

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Mario DiMarco

Serial No.: 09/224,029

Filing Date: December 31, 1998

Title: METHODS AND APPARATUS FOR CIRCUIT INTEGRATION

Examiner: Tuan T. Dinh

Art Unit: 2841

TO: Box APPEAL BRIEF-FEE
Assistant Commissioner for Patents
Washington, D.C. 20231

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**APPELLANT'S BRIEF
PURSUANT TO 37 C.F.R. § 1.192**

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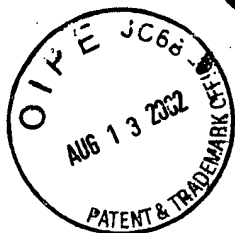


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Dear Assistant Commissioner:

Appellant appeals the decision of the Examiner finally rejecting all of the claims pending in the present application, namely claims 6-24. A Notice of Appeal was filed by Appellant on June 13, 2002 and this Notice of Appeal was indicated as being accepted by the United States Patent and Trademark Office on June 13, 2002. **This appeal brief is being submitted in triplicate.**

I. REAL PARTY IN INTEREST

Honeywell, Inc. is the real party in interest in the subject application, by virtue of an Assignment from inventor Mario DiMarco to Honeywell, Inc. (recorded on March 26, 1999 at Reel 010241, Frame 0847).

II. RELATED APPEALS AND INTERFERENCES

No appeal or interference will directly affect, be directly affected by, or have a bearing on the decision to be rendered by the Board of Patent Appeals and Interferences in the present Appeal.

III. STATUS OF CLAIMS

Claims 6-24 are pending in the application. Claims 1-5 were cancelled in Appellant's November 9, 2000 Amendment.

Claims 21-24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Keeth et al., U.S. Patent No. 5,430,615, issued July 4, 1995 ("Keeth") and are appealed herein.

Claims 6-8, 11, 12, and 15-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Martin, U.S. Patent No. 5,424,916, issued June 13, 1995 ("Martin") in view of Keeth and are appealed herein.

Claims 9 and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Martin in view of Keeth as applied to claims 6-8 and 11-20 and in further view of McKenzie, U.S. Patent No. 4,002,386, issued January 11, 1977 ("McKenzie") and are appealed herein.

Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Martin in view of Keeth as applied to claims 6-8 and 11-20 and in further view of Tollbom, U.S. Patent No. 5,793,614, issued August 11, 1998 ("Tollbom") and are appealed herein.

IV. STATUS OF AMENDMENTS

An amendment was filed in the Response to Office Action filed on April 2, 2001 amending claim 15, but denied entry. An amendment was filed in the Preliminary Amendment for the Continued Prosecution Application filed on July 5, 2001 amending claims 6 and 15, and has been entered by the Examiner.

V. SUMMARY OF INVENTION

The present invention relates to a circuit integration system for an integrated modular avionics (IMA) cabinet which houses printed circuit board (PCB) modules. In accordance with an exemplary embodiment of the present invention, the IMA cabinet includes a chassis configured with slots for receiving the PCB modules. The chassis of the IMA cabinet also includes a rear panel configured for connecting to connectors, wire harnesses, and the like. In an

exemplary embodiment, at least one of the PCB modules of the IMA cabinet is configured as a circuit interface module for integrating and allocating various signals and outputs received and transmitted between the PCB modules in the IMA cabinet and various systems connected to the IMA cabinet. The PCB module configured as the circuit interface module is directly connected to the other PCB modules in the IMA cabinet through a common bus and directly connected to other systems through wiring harnesses connected to the rear panel of the IMA cabinet. The PCB module configured as the circuit interface module is further configured to connect to the common bus and the wiring harnesses without using cables or flexprint connections. Accordingly, the PCB module configured as the circuit interface module is easily removed from the IMA cabinet for reconfiguration, repair, and replacement. Specification, p. 2, line 19 to p. 3, line 11.

VI. ISSUES

The issues presented on appeal are:

1. Whether the prior art anticipates Appellant's claims.
2. Whether the Examiner has established a *prima facie* case of obviousness by a preponderance of the evidence.
3. Whether the prior art suggests the desirability of combining the cited references to meet Appellant's claims in the manner proposed by the Examiner.
4. Whether the prior art suggests the desirability of modifying the cited references to meet Appellant's claims.

VII. GROUPING OF CLAIMS

The Examiner's rejection of claims 6-20 under 35 U.S.C. §103(a) do not stand or fall together. More specifically, the following groups of claims are believed to be separately patentable:

- In Group I, claim 6 stands alone;
- In Group II, claim 7 stands alone;
- In Group III, claim 8 stands alone;
- In Group IV, claim 9 stands alone;

In Group V, claim 10 stands alone;
In Group VI, claim 11 stands alone;
In Group VII, claim 12 stands alone;
In Group VIII, claim 13 stands alone;
In Group IX, claim 14 stands alone;
In Group X, claim 15 stands alone;
In Group XI, claim 16 stands alone;
In Group XII, claim 17 stands alone;
In Group XIII, claim 18 stands alone;
In Group XIV, claim 19 stands alone; and
In Group XV, claim 20 stands alone.

The Examiner's rejection of claims 21-24 under 35 U.S.C. §102(b) do not stand or fall together. More specifically, the following groups of claims are believed to be separately patentable:

In Group XVI, claim 21 stands alone;
In Group XVII, claim 22 stands alone;
In Group XVIII, claim 23 stands alone; and
In Group XIX, claim 24 stands alone.

VIII. ARGUMENT

A. The Examiner Has Not Established Anticipation Of Appellant's Claims By The Cited Reference

The Examiner rejected claims 21-24 under 35 U.S.C. § 102(b) as being anticipated by Keeth et al., U.S. Patent No. 5,430,615, issued July 4, 1995 ("Keeth").

To sustain this rejection, the Examiner must establish that "the invention was patented or described in a printed publication in this or a foreign country...more than one year prior to the date of the application for patent in the United States". 35 U.S.C. § 102(b). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). To anticipate a claim for

a patent, a single prior source must contain each of its limitations. Hybridtech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1376, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986); In re Donohue, 766 F.2d 531, 226 U.S.P.Q. 619, 621 (Fed. Cir. 1985). In other words, “every limitation of a claim must identically appear in a single prior art reference for it to anticipate the claim.” Gechter v. Davidson, 116 F.3d 1454 (Fed. Cir. 1997) (emphasis added). “To anticipate a claim, a reference must disclose every element of the challenged claim and enable one skilled in the art to make the anticipating subject matter.” PPG Indus., Inc. v. Guardian Indus. Corp., 75 F.3d 1558 (Fed. Cir. 1996).

The Examiner has not established anticipation of Appellant’s claims because, *inter alia*, the prior art reference does not disclose all of the elements of Appellant’s claims. Because the Examiner has not established anticipation, claims 21-24 are patentable over the Keeth reference. Thus, Appellant respectfully requests that the rejection of these claims under 35 U.S.C. § 102(b) be withdrawn.

Keeth discloses a casing or frame 2 divided by internal walls 6 to have equal-sized compartments 10A-10G. Each compartment can receive a double-wide module 14 or two single-wide modules 16. Double-wide module 14 has a main circuit board assembly 20 and a backplane assembly 24. Main circuit board assembly 20 includes a main circuit board 28 attached to a front panel 32 at one end and a female portion or receptacle 36 (of a DIN connector) at the other end. Backplane assembly 24 has a male portion or header 40 (of the DIN connector) to connect with receptacle 36. Thus, main circuit board 28 can connect to backplane assembly 24. Col. 5-Col. 6.

However, Keeth fails to disclose either a connector assembly “configured to integrate and allocate signals between said plurality of circuit integration modules” as recited in claim 21, or a connector assembly “configured to integrate and allocate signals between said plurality of circuit integration modules and said avionics cabinet” as recited in claim 22. In addition, Keeth fails to disclose “integrating and allocating signals between said plurality of circuit integration modules via said connector assembly” as recited in claim 23, or “integrating and allocating signals between said plurality of circuit integration modules and said avionics cabinet via said connector assembly” as recited in claim 24. Rather, Keeth merely discloses a conventional backplane assembly 24 for electrically connecting to main circuit board 28. Indeed, the Keeth references states that when “the main circuit board assembly is inserted into compartment 10F, the

connector portion 36 of the main circuit board engages the connector portion 40 of backplane assembly 24 and reliable electrical connection is established between the main circuit board and appropriate points of the backplane assembly” (Col. 7). Accordingly, Keeth does not disclose where backplane assembly 24 integrates and allocates signals between the modules 14, or between the modules 14 and casing or frame 2. The main circuit board and the connector assembly 24 in Keeth merely establish an electrical connection.

Thus, under Hybridtech, Inc. v. Monoclonal Antibodies, Inc., In re Donohue, Gechter v. Davidson, and PPG Indus., Inc. v. Guardian Indus. Corp., Keeth fails to disclose every limitation of each of claims 21-24, so that claims 21-24 are patentable over the Keeth reference. To the extent mentioned by the Examiner, Keeth also fails to disclose one or more of the claimed elements in claim 21, so that claim 21 is also patentable over Keeth. Accordingly, for all of the foregoing reasons, the Examiner has failed to carry his burden that Claims 21-24, Groups XVI through XIX, are anticipated by the cited reference. Therefore, the Groups XVI through XIX claims are patentable over the cited reference. Applicant respectfully requests withdrawal of this rejection.

B. The Examiner Has Not Established A *Prima Facie* Case Of Obviousness By A Preponderance Of The Evidence

Under 35 U.S.C. § 103(a), “a patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains”. To sustain an obviousness rejection, the Examiner has the initial burden to establish a *prima facie* case of obviousness. Furthermore, the burden the Examiner must establish for a *prima facie* case of obviousness is by a preponderance of the evidence. To establish a *prima facie* case of obviousness, the Examiner must establish the following: (1) there must be some suggestion or motivation (in the references or knowledge generally available to one of ordinary skill in the art) to modify the reference or combine references; (2) there must be a reasonable expectation of success; and (3) the reference (or references when combined) must teach or suggest all the claim limitations. M.P.E.P. § 2142.

To establish a *prima facie* case of obviousness, the Examiner must show either how the

prior art references suggest, either expressly or impliedly, the combination that results in Appellant's claims or, alternatively, the Examiner must present a convincing line of reasoning as to why one skilled in the art would have found the claims to have been obvious in light of the teachings of the references. Ex parte Clapp, 227 U.S.P.Q. 972, 973 (Bd. of Pat. Appeals and Interferences, 1985). When the motivation to combine the teachings of the prior art references is not immediately apparent, it is the duty of the Examiner to explain why the combination of the teachings is proper. Ex parte Skinner, 2 U.S.P.Q.2d 1788 (Bd. of Pat. Appeals and Interferences, 1986).

"The factual inquiry whether to combine references must be thorough and searching". In re Sang Su Lee, 277 F.2d 1338, 1342, 61 U.S.P.Q.2d (BNA) 1430 (Fed. Cir. 2002) (citing McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1351-52, 60 U.S.P.Q.2d (BNA) 1001, 1008 (Fed. Cir. 2001)). "It must be based on objective evidence of record". In re Sang Su Lee at 1342. "This precedent has been reinforced in myriad decisions, and cannot be dispensed with". Id. (citing Brown & Williamson Tobacco Corp. Philip Morris Inc., 229 F.3d 1120, 1124-25, 56 U.S.P.Q.2d (BNA) 1456, 1459 (Fed. Cir. 2000) ("a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding'" quoting C.R. Bard, Inc., v. M3 Systems, Inc., 157 F.3d 1340, 1352, 48 U.S.P.Q.2d (BNA) 1225, 1232 (Fed. Cir. 1998); In re Dembiczak, 175 F.3d 994, 999, 50 U.S.P.Q.2d (BNA) 1614, 1617 (Fed. Cir. 1999)).

"This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 U.S.P.Q. (BNA) 303, 312-13 (Fed. Cir. 1983). "Thus the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion". In re Sang Su Lee at 1343-44.

The test of obviousness is not whether features of a secondary reference may be bodily incorporated into a primary reference's structure, nor whether a claimed invention is expressly suggested in any one or all of the references. Instead, the test is what the combined teachings of references would have suggested to those of ordinary skill in the art. In re Keller, Terry, and

Davies, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981). Finally, the claimed invention cannot be used as an instruction manual or “template” to piece together teachings of the prior art so that the claimed invention is rendered obvious. In re Fritsch, 23 U.S.P.Q.2d 1780, 1783-84 (C.A.F.C. 1992).

The Examiner has not established a *prima facie* case of obviousness because, *inter alia*, (1) the prior art references, taken together, do not teach or suggest all of the elements of Appellant’s claims; (2) there is no suggestion in the prior art to combine or modify references to meet Appellant’s claims; and (3) combination of the prior art references does not result in Appellant’s claims. Because the Examiner has not met his burden of establishing obviousness by a preponderance of the evidence, claims 6-20, and consequently Groups I-XV, are patentable over the various references and/or the combinations. Thus, Appellant respectfully requests that the rejection of these claims under 35 U.S.C. § 103(a) be withdrawn.

Martin in view of Keeth

The Examiner rejected claims 6-8, 11, 12, and 15-20 under 35 U.S.C. § 103(a) as being unpatentable over Martin, U.S. Patent No. 5,424,916, issued June 13, 1995 (“Martin”) in view of Keeth. Applicant respectfully traverses this rejection.

Martin discloses a combination conductive and convective heatsink for use in an electronic module. A heatsink member 10 includes first and second major planar surfaces 12 and 14, respectively. Adjacent surfaces 12 and 14 is an object from which heat is to be transferred, where the object is an electronic circuit board. The conductive and flow-through heatsink uses heat pipes 18a-18d and 23 with flow-through passage areas 20a-20e. Heat pipes 18a-18d and 23 are used to conduct heat from surfaces 12 and 14 to a mounting rack 42. For example, heat pipe 18b is a conventional heat pipe having wicking material 22 located on the inner surface of the pipe. Alternatively, solid heat pipe 23 has carbon fibers 24 oriented to conduct heat from surfaces 12 and 14 to mounting rack 42. Conductive and convective heatsink 10a is used with electronic module 30 having first and second electronic circuit boards 32 and 34. The “module” in Martin (i.e., electronic module 30) works with conductive and convective heatsink 10a. The first and second electronic circuit boards 32 and 34 of electronic module 30 are placed on either side of conductive and convective heatsink 10a. In this way, electronic “module” 30 consists of two circuit boards, namely, first and second electronic circuit boards 32 and 34, electronic

module connector 50, and connector pins 51. Electronic module 30 is mounted in mounting rack 42 having side walls 41 and 43, motherboard 44, and connectors 46a-46c. A “recess 48 guides electronic module 30 into mounting rack 42 until electronic module connector 50 and connector pins 51 engage and mate with mother board connector 46b”. Col. 4 to Col. 5.

As discussed above, Keeth discloses a casing or frame 2 with equal-sized compartments 10A-10G, where each compartment can receive a double-wide module 14 or two single-wide modules 16. Double-wide module 14 has a main circuit board assembly 20 and a backplane assembly 24. Main circuit board assembly 20 includes a main circuit board 28 attached to a front panel 32 at one end and a female portion or receptacle 36 (of a DIN connector) at the other end. Backplane assembly 24 has a male portion or header 40 (of the DIN connector) to connect with receptacle 36. Thus, main circuit board 28 can connect to backplane assembly 24. Col. 5-Col. 6.

Claims 6 and 15

The Examiner alleges that Martin discloses a circuit integration module 30 having first and second circuit boards 32 and 34, and a connector assembly 50 coupled to each of the first and second circuit boards 32 and 34. The Examiner further alleges that connector assembly 50 is configured to provide a direct electrical interface 46a-46c for integrating and allocating signals between the first and second circuit boards 32 and 34 and an avionics cabinet 42. The Examiner admits that Martin does not disclose a faceplate coupled to the first and second circuit boards, but that Keeth teaches a casing 2 with a circuit integration module 14 having a faceplate 32 coupled to module 14. The Examiner argues that it would have been obvious to one of ordinary skill in the art at the time of invention to modify the integration module assembly of Martin to provide the faceplate coupled to the module as taught by Keeth in order to provide a handling module for insertion and removal to and from the cabinet.

However, Martin in view of Keeth fails to teach, advise, or suggest a connector assembly “configured to provide a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet” as recited in claim 6 (and claims 7, 8, 11, and 12, which variously depend from claim 6). Martin in view of Keeth also fails to teach, advise, or suggest “securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet” as recited in claim 15 (and claims 16-20, which variously depend from claim 15).

Rather, Martin is a multimode heatsink for an electronic module, where the heatsink can be cooled by conduction or convection. Col. 1, lines 5-11. Although Martin discloses an electronic module 30, as discussed above, Martin is concerned with the conduction and convection of the heatsink and not the electronics of electronic module 30. For example, Martin extensively discusses the convection of the heatsink. A cooling medium enters the mounting rack and is directed into the module. "The cooling medium then flows through the electronic modules" and exits the mounting rack". Martin continues by discussing the specific flow of the cooling medium, supplemental conductive mode cooling, and other specific aspects of each. Col. 5, line 50 to Col. 6, line 19.

On the other hand, Keeth merely discloses a conventional backplane assembly 24 for electrically connecting to main circuit board 28. Indeed, when "the main circuit board assembly is inserted into compartment 10F, the connector portion 36 of the main circuit board engages the connector portion 40 of backplane assembly 24 and reliable electrical connection is established between the main circuit board and appropriate points of the backplane assembly" (Col. 7). Accordingly, no where does Keeth disclose where backplane assembly 24 integrates and allocates signals between the modules 14. Indeed, Keeth does not provide even merely an electrical connection between the modules 14, but rather provides the electrical connection between the main circuit board and the backplane assembly. In this manner, even the combination of Martin and Keeth fails to teach, advise, or suggest a direct electrical interface for integrating and allocating signals between circuit boards 32 and 34 and mounting rack 42. Thus, Martin in view of Keeth fails to teach, advise, or suggest a connector assembly "configured to provide a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet" as recited in claim 6.

To reiterate, although Keeth discloses an electrical connection between the main circuit board and the backplane assembly, Keeth fails to teach advise, or suggest providing a direct electrical interface between the modules 14 and casing or frame 2. Rather, Keeth is limited to providing an electrical connection between the main circuit board and the backplane assembly only (and not between the modules 14 and casing or frame 2). Accordingly, even the combination of Martin and Keeth fails to teach, advise, or suggest securing module 30 in mounting rack 42 in order to provide a direct electrical interface between module 30 and mounting rack 42. Thus, even the combination of Martin in view of Keeth fails to teach, advise,

or suggest “securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet” as recited in claim 15 (emphasis added).

Furthermore, the present invention recognizes a problem with such conventional cabinets as follows:

With reference to Figure 1, a conventional IMA cabinet 100 houses a number of modules 102 containing printed circuit boards. The modules 102 of the conventional IMA cabinet 100 are interconnected to each other and connected to wiring harnesses of the airplane through a circuit interface located at the rear of the conventional IMA cabinet 100. The circuit interface, however, may take up considerable amount of space. For example, in one conventional IMA cabinet, the circuit interface may take up as much as 5 inches out of a total of 20 inches available for the entire cabinet. Additionally, the connections formed in the circuit interface of a conventional IMA cabinet are typically hard wired. Consequently, when the connections need to be reconfigured, repaired, or replaced, the connections formed in the circuit interface typically needs to be re-wired, which can be costly and time consuming.

Present Application, p. 2, lines 1-10. The present invention helps resolve such wiring problems by providing a connector assembly “configured to provide a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet” as recited in claim 6 and “securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet” as recited in claim 15. As such, the present invention recognizes a problem with convention electrical interfaces and wiring and helps resolve this problem, which Martin and Keeth fail to recognize, and consequently, fail to address.

Still further, neither Martin nor Keeth suggest or show motivation for combining connector assembly 50 in Martin with front panel 32 of Keeth as proposed by the Examiner. Indeed, Martin is geared toward heat dissipation, whereas, Keeth is geared toward spacing of components. As such, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Examiner. See ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984) (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Furthermore, as required under In re Sang Su Lee, Ex parte Clapp and, Ex parte Skinner, the Examiner has not shown how the prior art references suggest the combination

that results in Appellant's claims, or alternatively, the Examiner has not presented a convincing line of reasoning as to why one skilled in the art would have found the claims to have been obvious in light of the teachings of the references.

Accordingly, under *In re Fitch*, the Examiner is improperly picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the "template". Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify Martin in view of Keeth to include the missing claimed elements. Regardless, Martin in view of Keeth fails to teach, advise, or suggest the missing claimed elements.

Thus, Martin in view of Keeth fails to teach, advise, or suggest a connector assembly "configured to provide a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet" as recited in claim 6. Martin in view of Keeth also fails to teach, advise, or suggest "securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet" as recited in claim 15. Therefore, claims 6 and 15 are patentable over Martin in view of Keeth. Applicant respectfully requests withdrawal of this rejection.

Claims 7 and 8

The Examiner alleges that Martin discloses the circuit integration module 30 further comprising spacers 10 separating the first and second circuit boards 32 and 34, such that a gap 20 is formed between the first and second circuit boards 32 and 34. However, Martin in view of Keeth fails to teach, advise, or suggest "spacers separating said first and second circuit boards such that a gap between said first and second circuit boards is formed" as recited in claim 7. Heatsink member 10 is clearly not a spacer forming a gap between the first and second circuit boards as proposed by the Examiner. Rather, the conductive and flow-through heatsink uses heat pipes 18a-18d and 23 with flow-through passage areas 20a-20e to transfer heat from an object, namely the first and second circuit boards. Thus, Martin in view of Keeth fails to teach, advise, or suggest one or more of the claimed elements, so that claim 7 would not have been obvious over Martin in view of Keeth.

The Examiner further alleges that Martin discloses the circuit integration module 30, where the gap 20 is configured to align with the ventilation hole 54 in the avionics cabinet.

However, Martin in view of Keeth further fails to teach, advise, or suggest where “said gaps are configured to align with ventilation holes in said avionics cabinet” as recited in claim 8. As discussed above, electronic module 30 is mounted in mounting rack 42 having side walls 41 and 43, motherboard 44, and connectors 46a-46c. A “recess 48 guides electronic module 30 into mounting rack 42 until electronic module connector 50 and connector pins 51 engage and mate with mother board connector 46b”. Recess 48 also has an opening 54, which “provides access to flow-through passage 58 located in side wall 43 of electronic module mounting rack 42” (Col. 5). However, no where in Martin is the alleged “gap”, heatsink member 10, aligned with opening 54 in mounting rack 42. Rather, recess 48 guides electronic module 30 into mounting rack 42 via opening 54.

Thus, Martin in view of Keeth fails to teach, advise, or suggest one or more of the claimed elements, so that claim 8 would not have been obvious over Martin in view of Keeth. Applicant respectfully requests withdrawal of this rejection.

Claims 11 and 12

The Examiner alleges that Martin discloses a circuit integration module 30, where the module 30 is configured to be inserted and supported into slots 48 having a guide rail in the avionics cabinet.

However, Martin fails to teach, advise, or suggest where “said module is further configured to be inserted into slots in said avionics cabinet” as recited in claim 11. Martin in view of Keeth also fails to teach, advise, or suggest where “said module is configured to be supported by at least one guide rail in said avionics cabinet” as recited in claim 12. A “recess 48 guides electronic module 30 into mounting rack 42 until electronic module connector 50 and connector pins 51 engage and mate with mother board connector 46b”. Recess 48 also has an opening 54, which “provides access to flow-through passage 58 located in side wall 43 of electronic module mounting rack 42” (Col. 5). Accordingly, recess 48 guides electronic module 30 into mounting rack 42 via opening 54. However, contrary to the claimed invention, recess 48 is not a guide rail. A recess is, e.g., “an indentation or small hollow” (WEBSTER’S II NEW COLLEGE DICTIONARY 925 (1995)), whereas a rail is, e.g., “a horizontal bar supported by vertical posts, as in a fence”(WEBSTER’S II NEW COLLEGE DICTIONARY 914 (1995)). Accordingly, the former is an indentation, whereas the latter is a protrusion.

Thus, Martin in view of Keeth fails to teach, advise, or suggest one or more of the

claimed elements, so that claims 11 and 12 would not have been obvious over Martin in view of Keeth. Applicant respectfully requests withdrawal of this rejection.

Claims 16 and 17

Martin in view of Keeth also fails to teach, advise, or suggest “aligning slots on said module with guides on said avionics cabinet” as recited in claim 16, or “aligning guides on said module with slots on said avionics cabinet” as recited in claim 17. Recess 48, the alleged slot and guide, is a part of mounting rack 42. As such, the slots on the module cannot be aligned with a separate element, the guides on the cabinet in Martin, as proposed by the Examiner, because recess 48 is only on mounting rack 42. Consequently, Martin teaches away from the claimed invention in that it teaches a slot and guide element, namely, recess 48 on mounting rack 42 only and not on electronic module 30. Thus, Martin in view of Keeth fails to teach, advise, or suggest one or more of the claimed elements, so that claims 16 and 17 would not have been obvious over Martin in view of Keeth. Applicant respectfully requests withdrawal of this rejection.

Claims 18-20

The Examiner alleges that Keeth teaches the method of insertion of a circuit integration module 14 into an avionics cabinet 2, where the module 14 is secured to the cabinet 2 by a jack-screw (not identified by the Examiner). The Examiner argues that it would not have been obvious to one having ordinary skill in the art at the time of invention to modify the method of Martin and provide the jack-screw (presumably in Keeth) to secure the module to the cabinet in order to fasten the module in the cabinet.

However, Martin in view of Keeth fails to teach, advise, or suggest “securing said module to said cabinet with a screw” as recited in claims 18 and 19, or where “said screw is a jack screw” as recited in claim 20. No where does Keeth or Martin disclose a screw for “securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet” as recited in claim 15 (from which claims 18-20 variously depend). Applicant respectfully requests clarification by the Examiner as to which element(s) in Keeth and/or Martin is/are a screw or a jack screw.

Furthermore, neither Martin nor Keeth suggest or show motivation for combining the references as proposed by the Examiner. Indeed, Martin is geared toward heat dissipation, whereas, Keeth is geared toward spacing of components. As such, Applicant submits that the

cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Examiner. See ACS Hosp. Sys., Inc. v. Montefiore Hosp., at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Furthermore, as required under In re Sang Su Lee, Ex parte Clapp, and Ex parte Skinner, the Examiner has not shown how the prior art references suggest the combination that results in Appellant's claims, or alternatively, the Examiner has not presented a convincing line of reasoning as to why one skilled in the art would have found the claims to have been obvious in light of the teachings of the references.

Accordingly, under In re Fitsch, the Examiner is improperly picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the "template". Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify Martin in view of Keeth to include the missing claimed elements. Regardless, Martin in view of Keeth fails to teach, advise, or suggest the missing claimed elements. Thus, Applicant respectfully requests withdrawal of this rejection.

Martin in view of Keeth and in further view of McKenzie

Claims 9 and 10

The Examiner rejected claims 9 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Martin in view of Keeth as applied to claims 6-8 and 11-20 and in further view of McKenzie, U.S. Patent No. 4,002,386, issued January 11, 1977 ("McKenzie"). Applicant respectfully traverses this rejection.

The Examiner alleges that Martin and Keeth disclose and satisfy all of the limitations of the claimed invention, except for a faceplate comprises a retractable handle. The Examiner alleges that McKenzie discloses a card cage 10 having a module 22 with a retractable handle 24.

However, Martin in view of Keeth and in further view of McKenzie fails to teach, advise, or suggest "wherein said faceplate comprises a handle" as recited in claim 9 or "wherein said handle is retractable" as recited in claim 10. The McKenzie reference discloses a handle, which locks in place to prevent it from pinching fingers against the printed circuit boards since there is no face plate covering the PCB. Accordingly, the handle in McKenzie is made to lock in place in order to make up for the missing faceplate. As part of the locking mechanism, a plurality of

pulling pins are disclosed that interact with slots in the handle to keep it in a locked position. Consequently, it is apparent that the handle is not retractable, but rather is attached to pins mounted in the printed circuit board. Slots in the handle move the handle over a pin to a keyhole 50/51 in the slot, which then locks the handle in position. Col. 2, lines 39-47. As such, McKenzie teaches a handle arrangement that requires pins to be mounted directly on to the printed circuit board and handle ends, which lock the handle in position.

Indeed, the McKenzie reference teaches away from the claimed invention in that the handle in McKenzie is made to lock into position. In addition, modifying the handle in McKenzie to include the missing claimed elements would render McKenzie improper for its intended purpose, namely to lock the handle in position. Consequently, even a combination of Martin in view of Keeth and in further view of McKenzie fails to teach, advise, or suggest the claimed invention as recited in claims 9 and 10.

Furthermore, neither Martin, Keeth, nor McKenzie suggest or show motivation for combining the references as proposed by the Examiner. Indeed, Martin is geared toward heat dissipation, whereas, Keeth is geared toward spacing of components and McKenzie is geared toward a self-locking handle for mounting modules. As such, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Examiner. See ACS Hosp. Sys., Inc. v. Montefiore Hosp., at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Furthermore, as required under In re Sang Su Lee, Ex parte Clapp, and Ex parte Skinner, the Examiner has not shown how the prior art references suggest the combination that results in Appellant's claims, or alternatively, the Examiner has not presented a convincing line of reasoning as to why one skilled in the art would have found the claims to have been obvious in light of the teachings of the references.

Accordingly, under In re Fitch, the Examiner is improperly picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the "template". Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify Martin and Keeth in view of McKenzie to include the missing claimed elements. More importantly, regardless, Martin in view of Keeth and in further view of McKenzie fails to teach, advise, or suggest the missing claimed elements.

Therefore, claims 9 and 10 are patentable over Martin in view of Keeth and in further view of McKenzie. Applicant respectfully requests withdrawal of this rejection.

Martin in view of Keeth and in further view of Tollbom

Claims 13 and 14

The Examiner rejected claims 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Martin in view of Keeth as applied to claims 6-8 and 11-20 and in further view of Tollbom, U.S. Patent No. 5,793,614, issued August 11, 1998 ("Tollbom"). Applicant respectfully traverses this rejection.

The Examiner alleges that Martin and Keeth disclose and satisfy all of the limitations of the claimed invention, except for first and second grooves configured to interface with first and second guide rails on a cabinet. The Examiner alleges that Tollbom teaches a module having first and second grooves 49 configured to interface with first and second guide rails 51 on a cabinet. The Examiner argues that it would have been obvious to one having ordinary skill in the art at the time of invention to modify the module of Martin and Keeth and provide the first and second grooves as taught by Tollbom in order to have easy insertion of the module into the cabinet.

Tollbom discloses an injector/ejector for an electronic module housing. A modular electronic system 10 has a chassis 12 and a removable module 14. The module 14 slides into and out of the chassis 12 along a slide axis 30. The module 14 has upper and lower fins 49, which slide within grooved guides 51 mounted on the upper and lower surfaces of a chassis chamber 50 of chassis 12.

However, Martin in view of Keeth and in further view of Tollbom fails to teach, advise, or suggest "a first groove configured to interface with a first guide rail on said avionics cabinet" as recited in claim 13. In addition, Martin in view of Keeth and in further view of Tollbom fails to teach, advise, or suggest "a second groove configured to interface with a second guide rail on said avionics cabinet" as recited in claim 14. Rather, Tollbom discloses upper and lower fins 49 on the module 14, and not a groove configured to interface with a "guide rail on said avionics cabinet" as recited in claims 13 and 14.

In addition, the grooved guides 51 are mounted on chassis chamber 50 of chassis 12, and as such are not part of the module 14. The first and second grooves as recited in claims 13 and

14, respectively, are part of the module. Thus, Tollbom fails to teach, advise, or suggest the first and second grooves as recited in claims 13 and 14.

Furthermore, neither Martin, Keeth, nor Tollbom suggest or show motivation for combining the references as proposed by the Examiner. Indeed, Martin is geared toward heat dissipation, whereas, Keeth is geared toward spacing of components and Tollbom is geared toward an injector/ejector mechanism for pivoting about a module. As such, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Examiner. See ACS Hosp. Sys., Inc. v. Montefiore Hosp., at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Furthermore, as required under In re Sang Su Lee, Ex parte Clapp, and Ex parte Skinner, the Examiner has not shown how the prior art references suggest the combination that results in Appellant's claims, or alternatively, the Examiner has not presented a convincing line of reasoning as to why one skilled in the art would have found the claims to have been obvious in light of the teachings of the references.

Accordingly, under In re Fitch, the Examiner is improperly picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the "template". Without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to combine Martin in view of Keeth and in further view of Tollbom to include the missing claimed elements. Regardless, Martin in view of Keeth and in further view of Tollbom fails to teach, advise, or suggest the missing claimed elements. Thus, claims 13 and 14 are patentable over Martin in view of Keeth and in further view of Tollbom. Applicant respectfully requests withdrawal of this rejection.

Therefore, for all of the foregoing reasons, the Examiner has failed to carry his burden that Claims 6-20, Groups I through XIX, are *prima facie* obvious by a preponderance of the evidence. Accordingly, the Groups I through XIX claims are patentable over the cited combinations of references.

C. Separately Patentable Claims

In addition to the foregoing discussion, the following various groups of claims are separately patentable for the following reasons:

With respect to Group XVI, claim 21 is patentable over the cited reference. The cited reference fails to disclose a connector assembly “configured to integrate and allocate signals between said plurality of circuit integration modules” as recited in claim 21.

With respect to Group XVII, claim 22 is patentable over the cited reference. The cited reference fails to disclose a connector assembly “configured to integrate and allocate signals between said plurality of circuit integration modules and said avionics cabinet” as recited in claim 22.

With respect to Group XVIII, claim 23 is patentable over the cited reference. The cited reference fails to disclose “integrating and allocating signals between said plurality of circuit integration modules via said connector assembly” as recited in claim 23.

With respect to Group XIX, claim 24 is patentable over the cited reference. The cited reference fails to disclose “integrating and allocating signals between said plurality of circuit integration modules and said avionics cabinet via said connector assembly” as recited in claim 24.

With respect to Group I, claim 6 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest a connector assembly “configured to provide a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet” as recited in claim 6.

With respect to Group II, claim 7 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest “spacers separating said first and second circuit boards such that a gap between said first and second circuit boards is formed” as recited in claim 7.

With respect to Group III, claim 8 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest where “said gaps are configured to align with ventilation holes in said avionics cabinet” as recited in claim 8.

With respect to Group IV, claim 9 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest where “said faceplate comprises a handle” as recited in claim 9.

With respect to Group V, claim 10 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest where “said handle is retractable” as recited in claim 10.

With respect to Group VI, claim 11 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest where “said module is further configured to be inserted into slots in said avionics cabinet” as recited in claim 11.

With respect to Group VII, claim 12 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest where “said module is configured to be supported by at least one guide rail in said avionics cabinet” as recited in claim 12.

With respect to Group VIII, claim 13 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest “a first groove configured to interface with a first guide rail on said avionics cabinet” as recited in claim 13.

With respect to Group IX, claim 14 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest “a second groove configured to interface with a second guide rail on said avionics cabinet” as recited in claim 14.

With respect to Group X, claim 15 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest “securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet” as recited in claim 15.

With respect to Group XI, claim 16 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest “aligning slots on said module with guides on said avionics cabinet” as recited in claim 16.

With respect to Group XII, claim 17 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest or “aligning guides on said module with slots on said avionics cabinet” as recited in claim 17.

With respect to Group XIII, claim 18 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest claim 15 further comprising “securing said module to said cabinet with a screw” as recited in claims 18.

With respect to Group XIV, claim 19 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest claim 16 further comprising "securing said module to said cabinet with a screw" as recited in claim 19.

With respect to Group XV, claim 20 is patentable over the various combination of references. The various combination of references fails to teach, advise, or suggest or where "said screw is a jack screw" as recited in claim 20.

IX. CONCLUSION

For the above reasons, claims 21-24 are patentable under 35 U.S.C. § 102(b) and are not anticipated by the cited reference. In addition, for the above reasons, claims 6-20 are patentable under 35 U.S.C. § 103(a) and are not obvious to one skilled in the art having knowledge of the cited combinations of references. Accordingly, Appellant respectfully submits that claims 6-24 are patentable over the prior art and respectfully requests this Board to so indicate.

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Respectfully submitted,

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X. APPENDIX OF CLAIMS ON APPEAL

Claims 1-5 have been cancelled.

6. A circuit integration module for insertion into an avionics cabinet, said module comprising:
 - first and second circuit boards;
 - a faceplate coupled to each of said first and second circuit boards; and
 - a connector assembly coupled to each of said first and second circuit boards opposite said faceplate, wherein said connector assembly is configured to provide a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet.
7. The circuit integration module of claim 6 further comprising spacers separating said first and second circuit boards such that a gap between said first and second circuit boards is formed.
8. The circuit integration module of claim 7 wherein said gaps are configured to align with ventilation holes in said avionics cabinet.
9. The circuit integration module of claim 6 wherein said faceplate comprises a handle.
10. The circuit integration module of claim 9 wherein said handle is retractable.
11. The circuit integration module of claim 6 wherein said module is further configured to be inserted into slots in said avionics cabinet.
12. The circuit integration unit of claim 6 wherein said module is configured to be supported by at least one guide rail in said avionics cabinet.
13. The circuit integration module of claim 6 further comprising a first groove configured

to interface with a first guide rail on said avionics cabinet.

14. The circuit integration module of claim 13 further comprising a second groove configured to interface with a second guide rail on said avionics cabinet.

15. A method of inserting a circuit integration module into an avionics cabinet, the method comprising the steps of:
aligning said module to a guide on said avionics cabinet;
inserting said module into said avionics cabinet along said guides; and
securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet.

16. The method of claim 15 wherein said aligning step comprises aligning slots on said module with guides on said avionics cabinet.

17. The method of claim 15 wherein said aligning step comprises aligning guides on said module with slots on said avionics cabinet.

18. The method of claim 15 wherein said securing step comprises securing said module to said cabinet with a screw.

19. The method of claim 16 wherein said securing step comprises securing said module to said cabinet with a screw.

20. The method of claim 19 wherein said screw is a jack screw.

21. An avionics cabinet, comprising:
a plurality of circuit integration modules for insertion into the avionics cabinet, wherein each circuit integration module includes at least one circuit board coupled between a faceplate and a connector assembly; and

said connector assembly is configured to integrate and allocate signals between said plurality of circuit integration modules.

22. The avionics cabinet of claim 21, wherein said connector assembly is configured to integrate and allocate signals between said plurality of circuit integration modules and said avionics cabinet.

23. A method for facilitating communication between a plurality of circuit integration modules, comprising the steps of:

configuring a plurality of circuit integration modules for insertion into the avionics cabinet, wherein each circuit integration module includes at least one circuit board coupled between a faceplate and a connector assembly; and

integrating and allocating signals between said plurality of circuit integration modules via said connector assembly.

24. The method of claim 23, further comprising the step of integrating and allocating signals between said plurality of circuit integration modules and said avionics cabinet via said connector assembly.